Loop-IP6416 IP-IMUX

ANSI Unit Front View

ETSI Unit Front View

Features

- 1U height, ETSI unit(full front access) or ANSI unit(front and back access)
- Rack mount, wall mount, and stand-alone
- WAN ports with 4 hot swappable slots
  - 4 E1/T1 ports per card; max up to 16 E1/T1 port per system
  - E1/T1 is software configurable
- Tributary ports
  - Fixed on main board
    - Up to 4 10/100 Fast Ethernet(FE)
  - Optional daughter card fixed on panel
    - 1 Optical FE
    - 1 Optical FE(SFP housing)
    - 2 combo Gigabit Ethernet(GbE)* with 2 RJ45 and 2 SFP housing
    - 1 DTE(V.36)* and 1 asynchronous RS232*. DTE optional interfaces can be either V.36/RS449, V.35 compatible, EIA530, or X.21
- Power modules
  - Hot-swappable -48 Vdc plug-in modules (-36 to -75 Vdc), dual for redundancy
  - AC plug-in module(100 to 240 Vac), dual for redundancy(ANSI only)
  - AC and DC(coexistent) fixed module(100 to 240 Vac and -36 to -75 Vdc)
- WAN link with virtually concatenated n x E1/T1, where n can be 1 to 16
- Encapsulation protocol: GFP, LAPS and PPP(without LCP)
- Differential delay, up to 256ms for E1 and 384ms for T1
- VLAN packet transparency
  - Packet size up to 12,000 bytes
  - IEEE 802.1ad Q-in-Q
- Timing sources for primary and secondary clocks are any one of E1/T1, DTE*, internal, external (manufacture option)
- Alarm relay
- Firmware download to local unit and remote unit
- Management port and interface
  - LCD with keypad on ANSI front panel
  - Console port, VT100 menu-driven
  - SNMP port
  - SNMPv1
  - Telnet via SNMP port
  - LoopView GUI EMS
  - Inband management in traffic bandwidth
- RoHS Compliant

* Future option

Description

The Loop-IP6416 IP Inverse Mux is a media converter. It allows service providers to offer Ethernet services over the existing copper, optical, or microwave infrastructure carrying the E1/T1 network. Up to 16 E1/T1 lines can be enabled and concatenated to form a single channel. Ethernet frames are mapped into this single concatenated channel.

The Loop-IP6416 offers up to 16 E1/T1 ports with an LED for each port. It has automatic E1/T1 channel failure detection and can reassign the number of E1/T1 channels transporting Ethernet traffic. For example, if there are 16 E1s configured for 10/100 Ethernet traffic transport, and one E1 fails during service, the other 15 will pick up the entire load. This minimizes the loss of IP packets.

Several power options exist including dual DC, front/back AC and hybrid AC/DC. The Loop-IP6416 supports a console port, which allows users to execute in-service diagnostics and fault isolation from a local or remote terminal. The Loop-IP6416 also allows remote site connection to Telnet via the Ethernet port. An Alarm Cut-Off(ACO) button is located on the panel.

Ordering Information

To order specify:

Note: RoHS compliant units are identified by the letter **G** appearing immediately at the end of the ordering code.

Model (RoHS compliant)	Description	Note
Main Unit		
Loop-IP6416-S-1UA-4FE-s1-s2-s3-s4-pp1-pp2-add2-add3-**G**	1U height ANSI unit(front and rear access) stand-alone with 4 Fast Ethernet(FE) ports	Where **s1, s2, s3, s4**, **pp1, pp2, add1, add2,** and **add3** are defined in tables below The add 1 is not applicable for 4 FE For allowed pp1, pp2 combinations, refer to **NOTE 1** Future option for 3FE
Loop-IP6416-S-1UA-3FE-s1-s2-s3-s4-pp1-pp2-add1-add2-add3-**G**	1U height ANSI unit(front and rear access) stand-alone with 3 Fast Ethernet(FE) ports and daughter board	
Loop-IP6416-S-1UE-4FE-s1-s2-s3-s4-pp1-pp2-add2-**G**	1U height ETSI unit(front access) stand-alone with 4 Fast Ethernet(FE) ports	
Loop-IP6416-S-1UE-3FE-s1-s2-s3-s4-pp1-pp2-add1-add2-**G**	1U height ETSI unit(front access) stand-alone with 3 Fast Ethernet(FE) ports and daughter board	
Hot-swappable Plug-in modules		
Loop-IP6416-S-ETD-**G**	Quad E1/T1 with DB25 female connector (E1-120 ohms/E1-75 ohms /T1 software selectable)	Conversion cable is not included
Loop-IP6416-S-EM-**G**	Quad E1-75 ohm with mini-BNC	
Loop-IP6416-S-ETR-**G**	Quad E1/T1 with RJ48C connector (E1-120 ohms/T1 software selectable)	
Plug-in Power Modules:		
Loop-IP6416-S-SA-**G**	Single AC power plug-in module (100 to 240 Vac)	For power redundancy, order a second power module For AC, choose an appropriate power cord
Loop-IP6416-S-SD48-**G**	Single -48 Vdc power plug-in module (-36 to -75 Vdc)	
Accessories		
Power Cord		
Loop-ACC-PC-USA	AC power cord for Taiwan/America	
Loop-ACC-PC-EU	AC power cord for Europe	
Loop-ACC-PC-UK	AC power cord for UK	
Loop-ACC-PC-AUS	AC power cord for Australia	
Loop-ACC-PC-CH	AC power cord for China	
Conversion Cable		
Loop-ACC-CAB-DB25M-100-8BNCM	DB25 Male to eight BNC Male extension cable(Length: 100 cm)	
Loop-ACC-CAB-DB25M-100-4RJ48M	DB25 Male to four RJ48C Plugs extension cable(Length: 100 cm)	
Loop-ACC-CAB-BNCM-100-MAXM	BNC Male to Mini BNC(MAX) Male conversion cable(Length: 100 cm)	
Loop-ACC-CAB-DB25M-30-1DB37F	DB25 Male to DB37 Female RS449 conversion cable(Length: 30 cm)	
Loop-ACC-CAB-DB25M-30-1M34F	DB25 Male to M34 Female V.35 conversion cable(Length: 30 cm)	
Loop-ACC-CAB-DB25M-200-1M34F	DB25 Male to M34 Female V.35 conversion cable(Length: 200 cm)	
Loop-ACC-CAB-DB25M-30-1DB15F	DB25 Male to DB15 Female X.21 conversion cable(Length: 30 cm)	
User's Manual		
Loop-IP6416-UM	This is an optional, paper copy. A CD version of the manual is already included as standard equipment.	

■ Where **s1, s2, s3, and s4** are used to select hot swappable plug-in E1/T1 modules for slots 1-4 (must select one).

s1, s2, s3 and s4 =	Description	Note
ETD	Quad E1/T1 with DB25 female connector (E1-120 ohms/E1-75 ohms /T1 software selectable)	Conversion cable is not included
EM	Quad E1-75 ohm with mini-BNC connector	
ETR	Quad E1/T1 with RJ48C connector (E1-120 ohms/T1 software selectable)	

■ Where **pp1** is used to select the 1st power module:

pp1 =	Description	Note
P9	Hybrid 100 to 240 Vac and -48 Vdc (-36 to -75 Vdc) coexist fixed power supply	· **P9** is a fixed power supply. If you order **P9** then you cannot select any items for pp2 · All plug-in power modules are interchangeable. · For AC, choose an appropriate power cord · **NOTE 1**
SA	Single AC power plug-in module (100 to 240 Vac)	
SD48	Single -48 Vdc power plug-in module(-36 to -75 Vdc)	

■ Where **pp2** is used to select the 2nd power module. If pp2 is not required leave this field blank.

pp2 =	Description	Note
SA	Single AC power plug-in module (100 to 240 Vac) for ANSI only	· If you ordered the **P9** fixed power supply in pp1 above, then you cannot select any items for pp2 and must leave the pp2 order field blank · For redundancy purposes, ordering a second plug-in module will provide dual power. · You cannot order a second **SA** for ETSI unit. · For AC, choose an appropriate power cord · **NOTE 1**
SD48	Single -48 Vdc power plug-in module (-36 to -75 Vdc)	

NOTE 1: The combinations of pp1 and pp2 power modules:
For ANSI unit:
- **pp1=P9**(Fixed AC and DC coexistent power at rear)
- **pp1=SA**(Single AC power plug-in in front or at rear)
- **pp1=SD48**(Single DC power plug-in at rear)
- **pp1=SD48, pp2=SD48**(Dual hot-swappable DC, both rear plug-in)
- **pp1=SA, pp2=SA**(Dual hot-swappable AC, one front and one rear plug-in)
- **pp1=SA, pp2=SD48**(Hot-swappable AC front and DC rear plug-in)

  Note: For ANSI unit, DC power is available in rear panel only

For ETSI unit (all power modules in front):
- **pp1=P9** (Fixed AC and DC coexistent power)
- **pp1=SA** (Single AC power plug-in)
- **pp1=SD48** (Single DC power plug-in)
- **pp1=SD48, pp2=SD48** (Dual hot-swappable DC power plug-in)

■ Where **add1** must be used to select one daughter card. If add1 is not required, leave this field blank.

	add1 =	Description	Note
DTE daughter card (Future option)	**DTE**	1 DTE(V.36, DB25 female connector) and 1 RS232* (DB9 female connector) daughter card. DTE optional interfaces can be either V.36/RS449, V.35, EIA530, or X.21. - V.36/RS449(via DB25 male to DB37 female conversion cable) - V.35 compatible(DB25 female connector) - V.35 compatible(via DB25 male to M34 female conversion cable) - EIA530(DB25 female connector) - X.21(via DB25 male to DB15 female conversion cable)	· Select one daughter card only · Conversion cable is not included. Order conversion cable separately from · Accessories listed in ordering information
Optical Fast Ethernet daughter card	**NHB3S**	Single mode 1*9, 1310 nm commercial (0 to +70°C), 30 km, SC duplex optical connector	· Select one daughter card only · See **Product Specifications** below for optical connector information. · Use **WHD2S** with **WHE2S** · Use **WHE2S** with **WHD2S**
	NHB5S	Single mode 1*9, 1310 nm commercial (0 to +70°C), 50 km, SC duplex optical connector	
	NHB3F	Single mode 1*9, 1310 nm commercial (0 to +70°C), 30 km, FC duplex optical connector	
	NHC2S	Single mode 1*9, 1550 nm commercial (0 to +70°C), 15 to 20 km, SC duplex optical connector	
	NHCUS	Single mode 1*9, 1550 nm commercial (0 to +70°C), 100 km, SC duplex optical connector	
	WHD2S	WDM mode 1*9(Bi-direction), Tx 1310 nm / Rx 1550 nm commercial(-0 to +70°C), 15 to 20 km, SC simplex optical connector	
	WHE2S	WDM mode 1*9(Bi-direction), Tx 1550 nm / Rx 1310 nm commercial(-0 to +70°C), 15 to 20 km, SC simplex optical connector	
Optical Fast Ethernet with SFP housing daughter card	**SFPC**	SFP(mini-GBIC) optical housing daughter card without SFP optical module	· Order SFP optical modules separately from SFP(FE) table below
Combo GbE daughter card (Future option)	**SFPGC**	Combo Gigabit Ethernet(GbE) daughter card with two RJ45 twisted pair GbE and two SFP(mini-GBIC) optical housing without SFP optical module.	· Order SFP optical modules separately from SFP(GbE) table below

SFP Optical Module for Fast Ethernet (FE):

SFP 155 Mbps (mini GBIC) Dual Fiber	**MHBTW**	Multi mode optical module with dual uni-directional fiber, 155M, 1310nm, 2Km, LC connector w/o DDM, Fast Ethernet and compliant with ITU G.957	· Use 2 fibers for all SFP optical modules
	PHB2W	Single mode optical module with dual uni-directional fiber, 155M, 1310nm, 15~20Km, LC connector w/o DDM, S-1.1/IR1	
	PHB3W	Single mode optical module with dual uni-directional fiber, 155M, 1310nm, 30Km, LC connector w/o DDM, S-1.1/IR1/Fast Ethernet	
	PHB5W	Single mode optical module with dual uni-directional fiber, 155M, 1310nm, 50Km, LC connector w/o DDM, L-1.1/LR1/Fast Ethernet	
	PHC8W	Single mode optical module with dual uni-directional fiber, 155M, 1550nm, 80Km, LC connector w/o DDM, L-1.2/LR2	
	PHCUW	Single mode optical module with dual uni-directional fiber, 155M, 1550nm, 100Km, LC connector w/o DDM, L-1.2/LR2Fast Ethernet	
	PHCXW	Single mode optical module with dual uni-directional fiber, 155M, 1550nm, 120Km, LC connector w/o DDM, L-1.2 extended distance	
	PHB3D	Single mode optical module with dual uni-directional fiber, 155M, 1310nm, 30Km, LC connector with DDM, S-1.1/IR1/Fast Ethernet	
	PHB5D	Single mode optical module with dual uni-directional fiber, 155M, 1310nm, 50Km, LC connector with DDM, L-1.1/LR1/Fast Ethernet	
	PHC8D	Single mode optical module with dual uni-directional fiber, 155M, 1550nm, 80Km, LC connector with DDM, L-1.2/LR2	
	PHCUD	Single mode optical module with dual uni-directional fiber, 155M, 1550nm, 100Km, LC connector with DDM, L-1.2/LR2/Fast Ethernet	
	PHCXD	Single mode optical module with dual uni-directional fiber, 155M, 1550nm, 120Km, LC connector with DDM, L-1.2 extended distance	

SFP Optical Module for Gigabit Ethernet (GbE):

1.25G (mini GBIC) Dual Fiber Commercial (0 to 70°C)	**MTAFW**	multi-mode optical module with dual uni-directional fiber, 1.25G, 850nm, 550m, LC connector w/o DDM, 1000Base-SX	▪ Use 2 fibers for all SFP optical modules ▪ All 1.25G optical module downgrading to 622M data rate will be workable
	MTAFD	multi-mode optical module with dual uni-directional fiber, 1.25G, 850nm, 550m, LC connector with DDM, 1000Base-SX	
	MTBTD	multi-mode optical module with dual uni-directional fiber, 1.25G, 1310nm, 2Km, LC connector with DDM, 1000Base-SX+	
	MTBTW	multi-mode optical module with dual uni-directional fiber, 1.25G, 1310nm, 2Km, LC connector w/o DDM, 1000Base-SX+	
	PTB3W	single-mode optical module with dual uni-directional fiber, 1.25G, 1310nm, 30Km, LC connector w/o DDM, 1000Base-LHX	
	PTB4W	single-mode optical module with dual uni-directional fiber, 1.25G, 1310nm, 40Km, LC connector w/o DDM, 1000Base-LHX	
	PTC5W	single-mode optical module with dual uni-directional fiber, 1.25G, 1550nm, 50Km, LC connector w/o DDM, 1000Base-XD	
	PTC6W	single-mode optical module with dual uni-directional fiber, 1.25G, 1550nm, 60Km, LC connector w/o DDM, 1000Base-XD	
	PTC8W	single-mode optical module with dual uni-directional fiber, 1.25G, 1550nm, 80Km, LC connector w/o DDM, 1000-Base-ZX	
	PTC9W	single-mode optical module with dual uni-directional fiber, 1.25G, 1550nm, 90Km, LC connector w/o DDM, 1000Base-ZY	
	PTCVW	single-mode optical module with dual uni-directional fiber, 1.25G, 1550nm, 110Km, LC connector w/o DDM, , 1000Base-APD	
	PTCXW	single-mode optical module with dual uni-directional fiber, 1.25G, 1550nm, 120Km, LC connector w/o DDM1000Base-APD	
	PTB1D	single-mode optical module with dual uni-directional fiber, 1.25G, 1310nm, 10Km, LC connector with DDM, 1000Base-LX	
	PTB3D	single-mode optical module with dual uni-directional fiber, 1.25G, 1310nm, 30Km, LC connector with DDM, 1000Base-LHX	
	PTB4D	single-mode optical module with dual uni-directional fiber, 1.25G, 1310nm, 40Km, LC connector with DDM, 1000Base-LHX	
	PTC5D	single-mode optical module with dual uni-directional fiber, 1.25G, 1550nm, 50Km, LC connector with DDM, 1000Base-XD	
	PTC6D	single-mode optical module with dual uni-directional fiber, 1.25G, 1550nm, 60Km, LC connector with DDM, 1000Base-XD	
	PTC8D	single-mode optical module with dual uni-directional fiber, 1.25G, 1550nm, 80Km, LC connector with DDM, 1000Base-ZX	
	PTC9D	single-mode optical module, with dual unidirectional fiber, 1.25G, 1550nm, 90Km, LC connector with DDM	
	PTCVD	single-mode optical module with dual uni-directional fiber, 1.25G, 1550nm, 110Km, LC connector with DDM, 1000Base-APD	
	PTCXD	single-mode optical module with dual uni-directional fiber, 1.25G, 1550nm, 120Km, LC connector with DDM, DDM1000Base-APD	
	PKB1W	single-mode optical module with dual uni-directional fiber, 622M~1.25G, 1310nm, 10Km, LC connector w/o DDM, 1000Bse-LX	

NOTE: For other special optical modules, please contact your nearest Loop sales representative.

■ Where **add2** is used to select an external clock. If an external clock is not required leave this field blank.

add2 =	Description	Note
EXT	External Clock	

■ Where **add3** is used to select a LCD display. If an LCD display is not required leave this field blank.

add3 =	Description	Note
LCD	LCD(2 x 16) front panel display	LCD is supported for ANSI unit only

Examples 1:
Main unit: Loop-IP6416-S-1UA-4FE-ETD-ETD-ETD-ETD-SA-SD48-EXT-LCD
Description: An ANSI unit with 4 Fast Ethernet(FE) ports, quad E1/T1 with DB25 connector, quad E1/T1 with DB25 connector, quad E1/T1 with DB25 connector, quad E1/T1 with DB25 connector, 100 to 240 Vac power, -36 to -75 Vdc power, external clock and LCD.

Examples 2:
Main unit: Loop-IP6416-S-1UA-3FE-ETD-ETD-ETD-P9-DTE-EXT-LCD
Description: An ANSI unit with 3 Fast Ethernet(FE) ports, quad E1/T1 with DB25 connector, quad E1/T1 with DB25 connector, quad E1/T1 with DB25 connector, 100 to 240 Vac and -48 Vdc(-36 to -75 Vdc) coexist fixed power supply, DTE(V.36) + RS232 daughter card, external clock and LCD.
Conversion cable: Loop-ACC-CAB-DB25M-30-1DB37F
Description: DB25 pin Male to DB37 Female RS449 conversion cable(Length: 30 cm)

Examples 3:
Main unit: Loop-IP6416-S-1UA-3FE-ETD-ETD-ETD-P9-DTE-EXT-LCD
Description: An ANSI unit with 3 Fast Ethernet(FE) ports, quad E1/T1 with DB25 connector, quad E1/T1 with DB25 connector, quad E1/T1 with DB25 connector, 100 to 240 Vac and -48 Vdc(-36 to -75 Vdc) coexist fixed power supply, DTE(V.36) + RS232 daughter card, external clock and LCD.
Conversion cable: Loop-ACC-CAB-DB25M-30-1M34F
Description: DB25 pin Male to M34 Female V.35 conversion cable(Length: 30 cm)

Examples 4:
Main unit: Loop-IP6416-S-1UE-4FE-EM-EM-SA-EXT-**G**
Description: An ETSI unit with 4 Fast Ethernet(FE) ports, quad E1-75 ohm with mini-BNC, quad E1-75 ohm with mini-BNC, 100 to 240 Vac power and external clock.

Examples 5:
Main unit: Loop-IP6416-S-1UE-3FE-ETR-ETR-ETR-ETR-SD48-SD48-SFPC
Description: An ETSI unit with 3 Fast Ethernet(FE) ports, quad E1/T1 with RJ48C connector, quad E1/T1 with RJ48C connector, quad E1/T1 with RJ48C connector, quad E1/T1 with RJ48C connector, dual hot-swappable -48 Vdc power and SFP(mini-GBIC) housing daughter card without SFP optical module.
Conversion cable: Loop-ACC-CAB-BNCM-100-MAXM
Description: BNC Male to Mini BNC(MAX) Male conversion cable(Length: 100 cm)

Loop-IP6416 IP I-MUX Product Specifications

Optical Module Characteristics for Fast Ethernet(FE)

Optical Module	Fiber Direction	Wavelength (nm)	Connector	Distance (km)	Power (dB)
NHB3S	Singlel mode dual uni-directional fiber	1310	SC(Subscriber Connector)	30	19
NHB5S	Single mode dual uni-directional fiber	1310	SC(Subscriber Connector)	50	30
NHB3F	Single mode dual uni-directional fiber	1310	FC(Fiber Connector)	30	19
NHC2S	Single mode dual uni-directional fiber	1550	SC Subscriber Connector)	15~20	17
NHCUS	Single mode dual uni-directional fiber	1550	SC(Subscriber Connector)	100	34
WHD2S	WDM mode single bi-directional fiber	1310 Tx / 1550 Rx	SC(Subscriber Connector)	15~20	19
WHE2S	WDM mode single bi-directional fiber	1550 Tx / 1310 Rx	SC(Subscriber Connector)	15~20	19

Optical SFP Module Characteristic for Fast Ethernet(FE)

SFP Optical Module	Direction	Wavelength(nm)	Connector	Distance
MHBTW	Dual uni-directional fiber	1310nm	LC	2 km
PHB2W	Dual uni-directional fiber	1310nm	LC	15~20 km
PHB3W	Dual uni-directional fiber	1310nm	LC	30 km
PHB5W	Dual uni-directional fiber	1310nm	LC	50 km
PHC8W	Dual uni-directional fiber	1550nm	LC	80 km
PHCUW	Dual uni-directional fiber	1550nm	LC	100 km
PHCXW	Dual uni-directional fiber	1550nm	LC	120 km
PHB3D	Dual uni-directional fiber	1310nm	LC(with DDM)	30 km
PHB5D	Dual uni-directional fiber	1310nm	LC(with DDM)	50 km
PHC8D	Dual uni-directional fiber	1550nm	LC(with DDM)	80 km
PHCUD	Dual uni-directional fiber	1550nm	LC(with DDM)	100 km
PHCXD	Dual uni-directional fiber	1550nm	LC(with DDM)	120 km

Optical SFP Module Characteristic for Gigabit Ethernet(GbE)

Optical Module	Fiber Direction	Wavelength (nm)	Connector	Distance	Power (dBm)
MTAFW	Dual uni-directional fiber	850	LC without DDM	550 M	8.5
MTAFD	Dual uni-directional fiber	850	LC with DDM	550 M	8.5
MTBTD	Dual uni-directional fiber	1310	LC with DDM	2 Km	10
MTBTW	Dual uni-directional fiber	1310	LC without DDM	2 Km	10
PTB3W	Dual uni-directional fiber	1310	LC without DDM	30 Km	20
PTB4W	Dual uni-directional fiber	1310	LC without DDM	40 Km	19
PTC5W	Dual uni-directional fiber	1550	LC without DDM	50 Km	20
PTC6W	Dual uni-directional fiber	1550	LC without DDM	60 Km	22
PTC8W	Dual uni-directional fiber	1550	LC without DDM	80 Km	24
PTC9W	Dual uni-directional fiber	1550	LC without DDM	90 Km	27
PTCVW	Dual uni-directional fiber	1550	LC without DDM	110 Km	30
PTCXW	Dual uni-directional fiber	1550	LC without DDM	120 Km	23
PTB1D	Dual uni-directional fiber	1310	LC with DDM	10 Km	15
PTB3D	Dual uni-directional fiber	1310	LC with DDM	30 Km	20
PTB4D	Dual uni-directional fiber	1310	LC with DDM	40 Km	19
PTC5D	Dual uni-directional fiber	1550	LC with DDM	50 Km	20
PTC6D	Dual uni-directional fiber	1550	LC with DDM	60 Km	22
PTC8D	Dual uni-directional fiber	1550	LC with DDM	80 Km	24
PTC9D	Dual uni-directional fiber	1550	LC with DDM	90 Km	27
PTCVD	Dual uni-directional fiber	1550	LC with DDM	110 Km	30
PTCXD	Dual uni-directional fiber	1550	LC with DDM	120 Km	23
PKB1W	Dual uni-directional fiber	1310	LC without DDM	10 Km	15

NOTE:

1. WHD2S (Master) is used with WHE2S(Slave).
2. For other special optical modules, please contact your nearest Loop sales representative.

WAN - E1 Interface

Line Rate	2.048M bps ± 50 ppm
Line Code	AMI/ HDB3
Framing	ITU G.704
Output Signal	ITU G.703
Input Signal	ITU G.703
Connector	RJ48C(120 ohm) DB25(120 ohm) with optional conversion cable mini BNC(75 ohm) with optional conversion cable
Jitter	ITU G.823

WAN - T1 Interface

Line Rate	1.544M bps ± 32 ppm
Line Code	AMI / B8ZS(selectable)
Framing	D4 / ESF(selectable)
Output Signal	DS1 with 0, -7.5, -15 dB LBO
Input Signal	DS1 with 0 dB to -26 dB ALBO
Connector	RJ48C DB25 with optional conversion cable
Pulse Template	Per AT&T TR 62411
Surge Protection	FCC Part 68 SubPart D

Encapsulation Protocol

Layer 2 protocol: GFP, LAPS and PPP (without LCP)

Tributary-Fast Ethernet(FE)

Ethernet Functions	10/100BaseT, IEEE802.3 Auto-negotiation(10/100M) Auto MDI/MDIX Full or half duplex
Connector	RJ45

Ethernet Bridge Function

VLAN packet transparency(up to 12,000 bytes)
Support IEEE 802.1q VLAN
Support IEEE 802.1ad Q-in-Q

SNMP Ethernet

Ethernet Functions	10/100BaseT, IEEE802.3 Auto-negotiation(10/100M) Auto MDI/MDIX Full or half duplex
Connector	RJ45

Tributary-Optical Fast Ethernet

Speed	100M Base-FX
Connector	FC/SC, LC

Tributary-Combo Gigabit Ethernet(GbE)

Speed	10/100/1000M bps
Connector	RJ45 for twisted pair GbE, LC for optical GbE

Tributary-DTE(V.36)

Data Rate	N x 64K bps(N = 1 to 128), 64K to 8.192M bps
Connector	DB25 female, DCE interface
Optional Interfaces	V.36/RS449(via DB25 male to DB37 female conversion cable) V.35 compatible(DB25 female connector) V.35 compatible(via DB25 male to M34 female conversion cable) EIA530(DB25 female connector) X.21(via DB25 male to DB15 female conversion cable)

Tributary-RS232

Data Rate	Up to 19.2 Kbps, Asynchronous
Connector	DB9S

Clock Source

Primary Clock	E1/T1, DTE, internal, external BNC External BNC is manufacture option. The type can be any one of a) 2.048M bps E1-120, b) 2.048M bps E1-75 and c) 1.544M bps T1, which are software selectable
Secondary Clock	E1/T1, DTE, internal, external(manufacture option)

Alarm Relay

Alarm Relay	Fuse alarm and performance alarm

Management

LEDs	Multi-color LEDs
ACO	A button of alarm cut-off
LCD	2 line by 16 character LCD with keypad
Console Port	Electrical: RS232, DCE Protocol: Menu driven VT-100 Connector: DB9S, female
Telnet	Access via SNMP Ethernet port
SNMP	SNMPv1
Inband Management	Inband management in traffic bandwidth

Diagnostics Test

Loopbacks	E1/T1 Line Loopback
Bert	Off/QRSS/PRBS/2^11-1/2^23-1

Performance Monitor

E1/T1 Performance

Performance Store	Last 24 hours performance in 15-minute intervals and last 7 days in 24-hour summary line, user
Performance Reports	Date & Time, Errored Second, Unavailable Second, Bursty Errored Second, Severe Errored Second count.
Monitor Registers	User, Line
Alarm History	Alarm Type(i.e. Master Clock Loss, RAI, AIS, LOS, BPV, ES, UAS)
Alarm Queue	Maximum 100 alarm records which record the latest alarm type, location, and date & time
Alarm Threshold	BPV, ES, UAS

Power

AC Module	100 to 240 Vac
-48 Vdc Module	-36 to -75 Vdc
AC and DC Module	100 to 240 Vac and -48 Vdc(-36 to -75 Vdc) fixed on panel
Power Consumption	< 30 watts

Physical

Dimensions	438 mm x 44 mm x 228 mm(WxHxD)
Temperature	0 - 50°C
Humidity	0 - 95% RH(non condensing)
Mounting	Desk-top stackable, wall mount

Certification

EMC	EN55022 Class A, EN55024, FCC Part 15 Class A
Safety	EN60950-1, IEC60950-1

Standards Compliance

ITU-T	G.703, G.704, G.705, G.775, G.806, G.823, G.7041/Y.1303, G.7042/Y.1305, G.7043/Y.1343, G.8021/Y.1341, G,8040/Y.1340
ATIS/ANSI	T1.107
IEEE	802.3, 802.1q, 802.ad
IETF	RFC1661

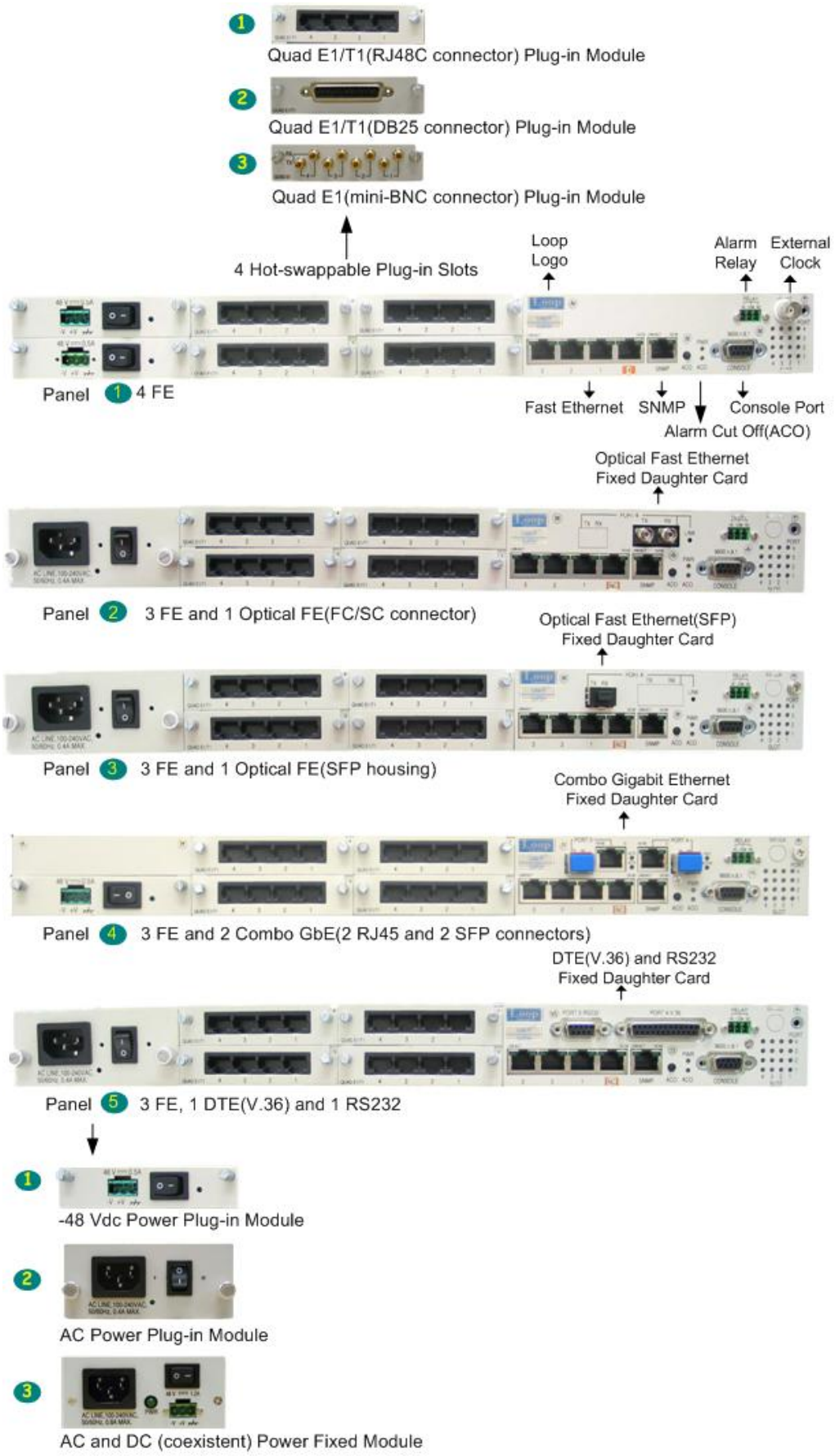
ANSI Unit Front Panel Views

Panel 1 ANSI Unit Front Panel with LCD

Panel 2 ANSI Unit Front Panel without LCD

AC Power Plug-in Module

ANSI Unit Rear Panel Views and ETSI Unit Front Panel Views



Note: ANSI: without logo, ETSI: with logo

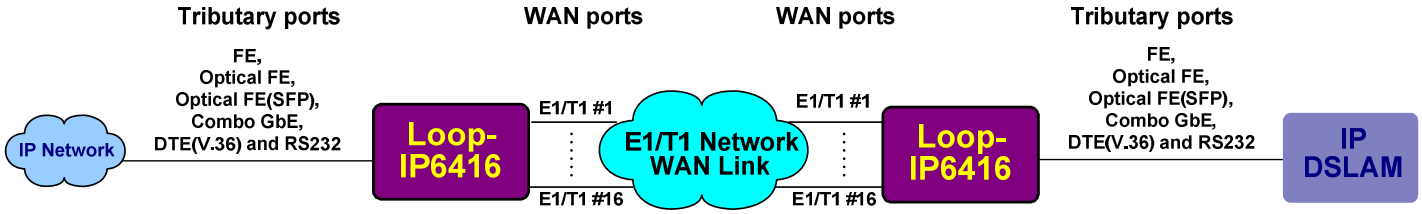
ETSI Rear Panel Views

Loop-IP6416 Maximum Capacity Reference Table

Max. Capacity of WAN port	Max. Capacity of Tributary Port on Main Board	Max. Capacity of Tributary on a Fixed Daughter Card	Note
16 E1/T1	4 FE	No daughter card	
16 E1/T1	3 FE	1 optical FE	
16 E1/T1	3 FE	1 optical FE(SFP housing)	
16 E1/T1	3 FE	2 combo GbE	Future option
16 E1/T1	3 FE	1 DTE(V.36) and 1 RS232	Future option

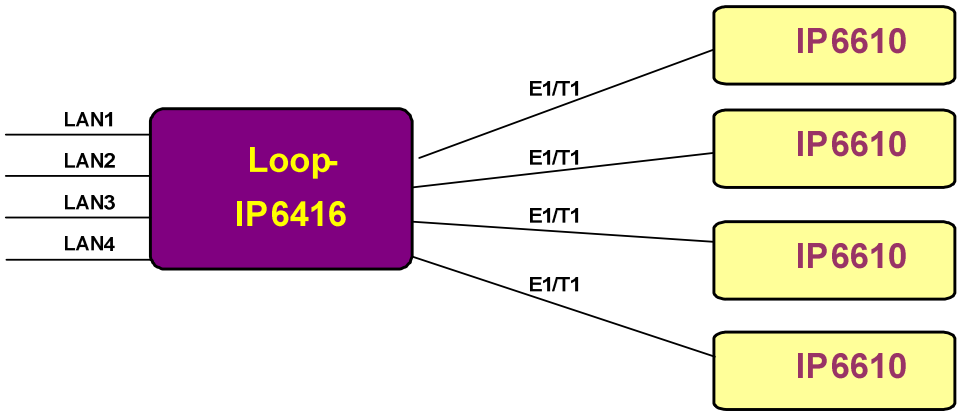
Application Illustration

Point to Point Application



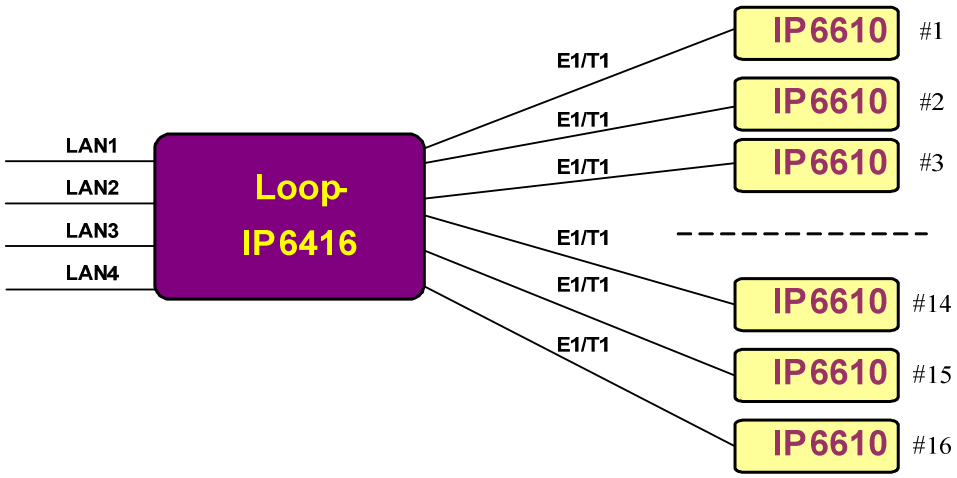
Point to Multipoint Application (VCAT disable)

If all of the packets from four Loop-IP6416 LANs are untagged, then one Loop-IP6416 can be connected to a maximum of four Loop-IP6610 devices.



Point to Multipoint Application (VCAT disable)

If all of the packets from four Loop-IP6416 LANs have different VLAN tags, then one Loop-IP6416 can be connected to a maximum of sixteen Loop-IP6610 devices.



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